DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the manufacturing method of the positive electrode mixture for organic electrolysis liquid cells.

[0002]

[Description of the Prior Art]Flat form organic electrolysis liquid cells are a long life, high tension, and high energy density, and demand is increasing all the more with development of small cordless electronic equipment, such as an electronic notebook in recent years and an electronic computer, because it is characterized by a lightweight thing. In much electronic equipment, while reinforcement, a miniaturization, and slimming down progress, as for the flat form organic electrolysis liquid cell used as the power supply, small size and what is highly efficient at a thin shape are demanded.

[0003]Drawing 1 is a sectional view of the common flat form organic electrolysis liquid cell 10. In the manufacturing method of this flat form organic electrolysis liquid cell 10, first, the positive pole pallet 1 is accommodated in the positive electrode can 3, the negative pole pellet 2 is accommodated in the negative electrode cap 4, and these positive pole pallets 1 and the negative pole pellet 2 are laminated via the separator 5. And the positive electrode can 3 in which this positive pole pallet 1 was accommodated, and the negative electrode cap 4 in which the negative pole pellet 2 was accommodated are closed and sealed where organic electrolysis liquid is filled via the obturation gasket 6, and they serve as the flat form organic electrolysis liquid cell 10.

[0004]Here, by mixing and corning a conducting agent and a binder to positive active material, the positive pole pallet 1 obtains positive electrode mixture, and is manufactured by carrying out press forming of the positive electrode mixture to predetermined shape.

[0005]As this positive active material, granular materials, such as manganese dioxide, cobalt acid lithium, fluoridation carbon, and vanadium pentoxide, are used according to the kind of cell.

[0006]As a conducting agent, the end of carbon powder, such as graphite and carbon black, is used.

[0007]As a binder, polytetrafluoroethylene resin (it is described as PTFE below), ethylene tetrafluoride perfluoro alkoxy ethylene copolymerization resin (it is described as the following PFA), Fluororesin powder, such as fluorinated ethylene-propylene copolymer (it is described as FEP below), or the suspension of those is used. A fluoro-resin is used as a binder because the chemical resistance to the organic solvent which is an electrolysis solution, and the heat resistance to heat treatment at the time of drying after fabricating a

positive pole pallet are superior to other resin.

[0008]

[Problem(s) to be Solved by the Invention]By the way, characteristic ****** of a positive pole pallet is large to battery capacity, and the characteristic of positive electrode mixture influences. For example, generally, when the compounding ratio of the binder in positive electrode mixture is low, the moldability of positive electrode mixture falls, It becomes easy to produce a chip and a crack in the positive pole pallet 1 in the time of an assembly of a cell, etc., handling becoming difficult and the chipped pellet powder bites between the positive electrode can 3 and the obturation gasket 6, and leakage resistance may be reduced.

[0009]On the other hand, when the compounding ratio of a binder is high, the homogeneity of positive electrode mixture, weighing nature, and electrolysis solution absorbency fall. And the capacity variation of a cell becomes large by the fall of the homogeneity of the ingredient of this positive electrode mixture, and the weighing variation at the time of fabricating to a positive pole pallet. Since the binder has oil repellency, the reaction between an electrolysis solution and positive active material falls, and the electrical property of a cell is degraded.

[0010]As a granulation method of positive electrode mixture, the method of corning with a rotary tableting type compression granulator, a rolled type compression granulator, a rolled type crack granulator (roll granulator), a spray-drying-granulation machine (spray dryer), etc. is used. Among these, since a compression granulation method and a crack granulation method are dry granulation, it has the fault that a required moldability is not obtained unless distribution of a binder is inferior as compared with the spray-drying-granulation method which is wet granulation, for this reason it makes the compounding ratio of a binder high. Since the shape is square as compared with a spray-drying-granulation method, the granulation particles obtained by these dry granulation have the fault that weighing nature is inferior.

[0011]On the other hand, since the shape of the granulation particles obtained by excelling in the homogeneity of the granulation particles obtained rather than a compression granulation method or a crack granulation method for a wet type is a globular form, a spray-drying-granulation method is excellent also in the weighing nature of granulation particles. However, in order to spray the slurry which carries out spray drying at an elevated temperature (not less than 100 **), Binding capability is high, and in order to fibrose with stress also at ordinary temperature, when PTFE generally used as a binder is used, in order that PTFE may fibrose on the surface of a granulation thing, granulation things stick and it has the fault that weighing nature falls remarkably. When FEP with low binding capability is used as a binder as compared with PTFE, it has the fault which is a positive electrode mixture solid content total amount that it cannot corn to a globular form since binding capability is low unless it adds 5% of the weight or more.

[0012]Thus, in order to manufacture the positive pole pallet excellent in conductivity and the absorbency of an electrolysis solution using the positive electrode mixture excellent in homogeneity, weighing nature, and a moldability, a binder is chosen appropriately, combination of the positive electrode mixture containing the selected binder is adjusted, and the granulation art of positive electrode mixture suitable for the selected binder is required.

[0013]This invention provides the positive electrode mixture which gives the conductivity which was excellent in homogeneity, weighing nature, and a moldability, and was excellent in the positive pole pallet, and electrolysis solution absorbency to such a conventional demand, and an object of this invention is to enable manufacture of the organic electrolysis liquid cell excellent in leakage resistance, a discharge

characteristic, and productivity.

[0014]

[Means for Solving the Problem]. In order to attain the above-mentioned purpose, this invention consists of positive active material, a conducting agent, a binder, and a solvent. A slurry with a mean particle diameter of 10 micrometers or less of 20 to 50 % of the weight of solid content and this solid content is prepared, and a manufacturing method of positive electrode mixture for organic electrolysis liquid cells corning this slurry by a spray drying method is provided.

[0015]A positive electrode mixture solid content total amount uses graphite or carbon black with a mean particle diameter of 10 micrometers or less three to 7% of the weight as a conducting agent as a desirable manufacturing method especially, Use fluorinated ethylene-propylene copolymer with a mean particle diameter of 0.1-0.5 micrometer as a binder, and as a solvent of a slurry, By cracking using water or water, and a mixed solvent of ethanol, and carrying out the wet blending of these mixtures with disintegrator, a slurry with a mean particle diameter of 10 micrometers or less of solid content is obtained, and a method of corning the slurry by a spray drying method is provided.

[0016]A manufacturing method of a positive pole pallet for organic electrolysis liquid cells fabricating on a pellet positive electrode mixture manufactured by doing in this way is provided.

[0017]According to the manufacturing method of positive electrode mixture of this invention, positive active material, a conducting agent, and a binder distribute uniformly in a slurry, and a conducting agent and a binder come to exhibit each function with small loadings. Therefore, positive electrode mixture obtained by this invention gives conductivity and electrolysis solution absorbency which became the thing excellent in homogeneity, weighing nature, and a moldability, and were excellent in a positive pole pallet.

[0018]

[Embodiment of the Invention]Hereafter, this invention is explained in detail.

[0019]In the manufacturing method of the positive electrode mixture of this invention, the slurry which performs the granulation of positive electrode mixture by a spray drying method, for this reason is used is formed from the mixture of the following positive active material, a conducting agent, a binder, and a solvent.

[0020]First, although manganese dioxide, cobalt acid lithium, fluoridation carbon, vanadium pentoxide, etc. can be used as positive active material according to the kind of cell, it is preferred to use manganese dioxide especially.

[0021]It is preferred to use FEP especially as a binder, in order to reduce the adhesive power of granulation things although PTFE, PFA, FEP, etc. can be used, and, as for the mean particle diameter, it is preferred to be referred to as 0.1-0.5 micrometer from a point of dispersibility.

[0022]As for the compounding ratio of a binder, it is preferred to use 1 to 3% of the weight of a positive electrode mixture solid content total amount. Thereby, FEP distributes uniformly in a drainage system slurry, and it becomes possible to secure a binding property required for positive electrode mixture at a small addition.

[0023]As a conducting agent, it is preferred to use detailed graphite or carbon black with a mean particle diameter of 10 micrometers or less, and it is preferred to mix the both sides of graphite and carbon black especially, so that it may become 3 to 7% of the weight of a positive electrode mixture solid content total amount. Since the graphite which is excellent in conductivity will distribute uniformly in a slurry by this, it

becomes possible to secure conductivity required for a positive pole pallet at a small addition. Since carbon black demonstrates the absorbency which was excellent since crystallinity was not developed, it becomes possible to raise the absorbency of the electrolysis solution of a positive pole pallet of it.

[0024]As a solvent of a slurry, it is preferred to use water or water, and the mixed solvent of ethanol. As for the compounding ratio of the ethanol in a mixed solvent, when using water and the mixed solvent of ethanol, it is preferred that below 20 capacity % carries out. Since evaporation of water is promoted as compared with the case where a water independent is used by using water and the mixed solvent of ethanol, desiccation of the fabricated positive pole pallet becomes easy.

[0025]To a slurry, a surface-active agent etc. can be added if needed besides each above ingredient.

[0026]The mixture which consists of the above positive active material, conducting agent, binder, and solvent is adjusted to 20 to 50 % of the weight of solid content. Since a solvent ratio becomes it high that a solid content is less than 20 % of the weight, desiccation becomes insufficient, and a granulation becomes difficult. On the contrary, conveyance of a slurry will become difficult if it exceeds 50 % of the weight.

[0027]The wet blending of the mixture of positive active material, a conducting agent, a binder, and a solvent is carried out with disintegrator so that it may become the mean particle diameter of 10 micrometers or less of the solid content in a slurry. a conducting agent and a binder distributing uniformly, and in a slurry, thereby, Since it becomes easier to corn by positive active material and a conducting agent being cracked and conductivity required for a positive pole pallet at the addition of few conducting agents and a binder and the binding property of positive electrode mixture can be secured, The positive electrode mixture which can give the conductivity which was excellent in homogeneity and a moldability and was excellent in the positive pole pallet, and electrolysis solution absorbency can be obtained.

[0028]The slurry which carried out wet blending is corned by a spray drying method, and is made into granularity. By corning by a spray drying method, the positive electrode mixture particles after a granulation can be made into globular form shape, and the weighing nature can be raised. Since granulation things are not sticky when FEP is especially used as a binder, the positive electrode mixture particles after a granulation can be easily made into globular form shape.

[0029]In this way, the positive electrode mixture of manufactured this invention can be fabricated on a pellet in accordance with a conventional method. For example, press forming can be carried out and the positive pole pallet 1 used for the flat form organic electrolysis liquid cell 10 shown in drawing 1 can be manufactured by carrying out heating drying.

[0030]The positive pole pallet manufactured in this way can be used for various organic electrolysis liquid cells (for example, rechargeable lithium-ion battery etc.).

[0031]

[Example]Hereafter, this invention is concretely explained based on an example.

[0032]The positive pole pallet for the manganese dioxide lithium cells of example 12450 size (cell outer diameter phi24.5mm, 5.0 mm of cell total amounts) was produced in the following procedures.

[0033]First, beta-MnO_2 (positive active material) which heat-treated electrolytic manganese dioxide at 400 ** for 4 hours, The graphite (conducting agent) whose mean particle diameter is 6 micrometers, and carbon black (conducting agent) whose mean particle diameter is 0.1 micrometer, The water-soluble suspension of FEP whose mean particle diameter is 0.2 micrometer is mixed at a rate of 93.5:4:1:1.5 by a dry weight ratio, Add pure water so that solid content may be 30% of the weight into the mixture, and After that, It cracked

carrying out wet blending until the mean particle diameter of solid content was set to 10 micrometers or less with disintegrator, the obtained slurry was corned by the spray drying method (atomizer number of rotations: 10000 rpm, blast temperature:200 **, exhaust-gas-temperature:100 **), and it was considered as positive electrode mixture.

[0034]Next, press forming was carried out to outer diameter phi20.0mm and 3.1 mm in height after being filled up with this positive electrode mixture in a predetermined metallic mold, vacuum drying was carried out at 400 ** for 12 hours, and the positive pole pallet was produced.

[0035]The positive pole pallet was produced like Example 1 except having set the compounding ratio of example 2 positive electrode mixture to beta-MnO_2:graphite:FEP=91.5:7:1.5.

[0036]The positive pole pallet was produced like Example 1 except having replaced with pure water and having used the water of ethanol 20 capacity % as a solvent of example 3 slurry.

[0037]Comparative example 1 electrolytic manganese dioxide. The water-soluble suspension of PTFE whose mean particle diameter is 0.2 micrometer is mixed with beta-MnO_2 heat-treated at 400 ** for 4 hours, the graphite whose mean particle diameter is 6 micrometers, and carbon black whose mean particle diameter is 0.1 micrometer at a rate of 93.5:4:1:1.5 by a dry weight ratio, The mixture was corned with the rolled type compression granulator, and it was considered as positive electrode mixture. Next, press forming was carried out to outer diameter phi20.0mm and 3.1 mm in height after being filled up with this positive electrode mixture in a predetermined metallic mold, vacuum drying was carried out at 400 ** for 12 hours, and the positive pole pallet was produced.

[0038]The positive pole pallet was produced like the comparative example 1 except having carried out crack granulation, using a rolled type crack granulator as a granulation method of comparative example 2 positive electrode mixture.

[0039]In the wet blending of comparative example 3 slurry, the positive pole pallet was produced like Example 1 except having added water so that solid content might be 15% of the weight.

[0040]In the wet blending of comparative example 4 slurry, the positive pole pallet was produced like Example 1 except having added water so that solid content might be 55% of the weight.

[0041]In the wet blending of comparative example 5 slurry, the positive pole pallet was produced like Example 1 except the mean particle diameter of solid content being in a not less than 10-micrometer crack state.

[0042]About each positive pole pallet of the example and the comparative example which is beyond evaluation, and was made and produced, (a) mass variation, (b) handling nature, and (c) electrolysis solution absorbency were measured as follows. A result is shown in Table 1.

[0043](a) Mass variation mass was measured with the electronic balance of 1 mg of accuracy of measurement, and the variation was investigated with standard deviation. (n= 100 pieces)

(b) The natural fall of the handling **** positive pole pallet was carried out on the stainless plate from a height of 20 cm, it was divided, generating of the chip was checked visually, and the crack and the chip incidence rate were searched for. (n= 20 pieces)

(c) Electrolysis solution absorbent each positive pole pallet was impregnated for 5 minutes into the electrolysis solution, and the electrolysis solution liquid adsorption (mass difference of the positive pole pallet before and behind being impregnated) of the positive pole pallet by the being impregnated was

measured with the electronic balance of 1 mg of accuracy of measurement. The electrolysis solution used what did 0.7 mol / L dissolution of lithium perchlorate for what mixed propylene carbonate and 1,2-dimethoxyethane by the volume ratio of 60:40. (n= 10 pieces)

[0044]The manganese dioxide lithium cell of 2450 sizes (cell outer diameter phi24.5mm, 5.0 mm of cell total amounts) was produced using each positive pole pallet as a flat form organic electrolysis liquid cell which has the same section structure as the flat form organic electrolysis liquid cell 10 of drawing 1 as follows.Namely, the thing which fabricated the lithium metal in the shape of a disk as the negative pole pellet 2 first, The positive pole pallet 1 which was stored to the negative electrode cap (negative pole terminal) 4 which performed the nickel plate to one side of the stainless plate of given thickness, next was produced by each example and a comparative example was stored in the positive electrode can (positive pole terminal) 3 which performed the nickel plate to one side of the stainless plate of given thickness. and the obturation gasket 6 which laminated the nonwoven fabric on both sides of the separator 5 pierced to the round form between the above-mentioned negative pole pellet 2 and the positive pole pallet 1, and carried out injection molding of the polypropylene for the positive electrode can 3 and the negative electrode cap 4 to predetermined shape -- passing -- the cell was produced by closing. The electrolysis solution used what did 0.7 mol / L dissolution of lithium perchlorate for what mixed the same propylene carbonate as what was used by the electrolysis solution absorbent examination, and 1,2-dimethoxyethane by the volume ratio of 60:40.

[0045]About each obtained cell, (d) positive electrode mixture granular material evaluated as follows the internal resistance of poor foreign matter ****** inserted between the positive electrode can 3 and the obturation gasket 6, (e) leakage resistance, and the (f) cell, and the (g) discharge characteristic. A result is shown in Table 1.

[0046](d) The cell after a foreign matter ****** poor assembly was disassembled, and it was investigated whether the foreign matter would be inserted between the positive electrode can and the obturation gasket with 20 times as many optical microscopes. (n= 50 pieces)

(e) It saved under the leakage resistance temperature of 60 **, and 90% of relative humidity environment, and the occurrences of the cell which spilt liquid by the 50th after a preservation start were counted visually. (n= 50 pieces)

(f) Measuring the internal resistance and (g) discharge characteristic internal resistance of a cell by a 1-kHz sinusoidal wave alternative current method under the temperature of 20 **, and a discharge characteristic discharging load resistance by 1komega and 6.8komega under the temperature of 20 **, and measuring the electric capacity with the final voltage 2.0V estimated. (n= 10 pieces)

[0047]

[Table 1]

Example Comparative example 1 2 31 2 3 4.5 [positive pole pallet manufacturing method] active-material: -- conducting agent: -- binder *1. *2 *1 *3 *3 *1 *1 *1 granulation method . A the slurry solids concentration for A A B C A A A spray drying (wt%) -- 30 30 30 - - 15 55 30 mean particle diameter (micrometer) <=10 <=10 <=10 - - <=10 <=10 >10 solvent Water Water ethanol / water . - - water Water Water [positive pole pallet] (a) mass (g).2.703 2.701 2.706 2.712. 2.703 2.709 2.711 2.695. Mass standard deviation 0.009 0.006 0.007. 0.037 0.034 0.028 0.0290.031 (b) cracks and KAKE incidence rate (%) 0 0 0 75 80 10 5 25 (c) liquid adsorption (mg) 431 389 433 335 330 435 431. Poor 429 [manganese dioxide lithium cell] (d) **** (%) 0 0 0 56 68(e) liquid spill

occurrences 0 0 0 4 8 (f) internal resistance (omega) 4.8 5.1 4.3 6.2 At the time of 6.4(g) service capacity (mAh) 1komega discharge 405 398 417. 333 321 At the time of 6.8komega discharge 569 567 569 567 561 (front notes)

*1) beta-MnO_2:graphite (6 micrometers): -- carbon black (0.1 micrometer): -- FEP (0.2 micrometer)

= 93.5:4:1:1.5*2 beta-MnO_2:graphite (6 micrometers): -- FEP (0.2 micrometer)

= 91.5:7:1.5*3 beta-MnO_2:graphite (6 micrometers): -- carbon black (0.1 micrometer): -- PTFE (0.2 micrometer)

= 93.5:4:1:1.5 granulation method A: Spray drying B: Compression granulation C: Crack granulation[0048] As shown in Table 1, the standard deviation of the mass of the positive pole pallet of Examples 1-3 is 0.006-0.009, and the small thing was checked to the standard deviation 0.028-0.037 of the mass of the positive pole pallet of the comparative examples 1-5 by a conventional method. The positive electrode mixture of the example which this cause produced by the method of this invention is guessed because granulation things are sticky and granulation shape is [that there is no **] also excellent in the weighing nature by the print end for a globular form.

[0049]Next, as compared with the positive pole pallet of the comparative examples 1-5 by a conventional method, as for the positive pole pallet of Examples 1-3, the thing which intensity depends on the shock at the time of handling, etc. highly and which it is divided and is been hard to produce a chip was checked. The positive electrode mixture of the example which also produced this cause by the method of this invention is guessed because the binder power by compression of granulation things is strong.

[0050]Next, it was checked that the positive pole pallet of Example 1 and Example 3 produced by the method of this invention is excellent in electrolysis solution absorbency as compared with the positive pole pallet of the comparative example 1 by a conventional method and the comparative example 2. As for this cause, since the binder is FEP, the positive electrode mixture of this example does not fibrose as compared with the positive electrode mixture of the comparative example which uses PTFE at the time of press forming, Oil repellency is small, and since the granulation method is a spray drying method, the shape of a granulation thing serves as a globular form, and the positive electrode mixture of this example can tend to do space uniform at the time of press forming, and is guessed because the space becomes a passage of an electrolysis solution.

[0051]When the moisture content of the positive pole pallet of Example 1 - Example 3 was measured with the Karl Fischer technique, in Example 3, the result with few [10 to 20%] moisture contents of the positive pole pallet which is a powerful enemy for an organic electrolysis liquid cell was obtained as compared with Example 1 and Example 2. Since the ethanol in ethanol 20 capacity % used for the solvent of the slurry promoted evaporation of water at the time of desiccation of a positive pole pallet, this cause is guessed.

[0052]in the case of the cell which uses the positive pole pallet of this example, it can check that poor foreign matter ****** is markedly alike, and it is improved as compared with the cell which uses the positive pole pallet of the comparative example 1 by a conventional method, and the comparative example 2 about evaluation of the cell which uses a positive pole pallet. Since the positive pole pallet by this example has the strong binding capacity by compression of granulation things, this cause is guessed because there are not a chip of a positive pole pallet and a crack at the time of a cell assembly.

[0053]it can check in the case of the cell which uses the positive pole pallet of this example, it being markedly alike and being improved also about liquid spill occurrences as compared with the cell which uses

the positive pole pallet of the comparative example 1 by a conventional method, and the comparative example 2. Since the positive pole pallet by this example has the strong binding capacity by compression of granulation things, this is also guessed because there are not a chip of a positive pole pallet and a crack at the time of a cell assembly.

[0054]The low tendency was accepted as compared with the cell by which the positive pole pallet of the comparative example 1 by a conventional method and the comparative example 2 was used for the cell which uses the positive pole pallet of this example about the internal resistance of a cell. By the cell of the comparative example 1 and the comparative example 2, since the dispersibility of a conducting agent is inferior, this is guessed that internal resistance is high.

[0055]Also in the spark test (1komega and 6.8 ohms), the result of above-mentioned internal resistance and the ****ing tendency were accepted.

[0056](a) mass variation, (b) handling nature, and (c) electrolysis solution absorbency were evaluated like **** about the positive pole pallet obtained by changing the manufacturing conditions of a positive pole pallet like example No[of the 4th example] of experiment .1 - No.5. The cell was produced like **** and each evaluation of the internal resistance of poor (d) foreign matter ****** of the cell, (e) leakage resistance, and the (f) cell and the (g) discharge characteristic was performed. These results are shown in Table 2.

[0057]The positive pole pallet was produced like Example 1 except having used the water-soluble suspension of FEP whose mean particle diameter is 1 micrometer as a binder of No.1 positive electrode mixture.

[0058]As a compounding ratio of the binder in No.2 positive electrode mixture, the positive pole pallet was produced like Example 1 except having used 3.5% of the weight of the positive electrode mixture total amount.

[0059]The positive pole pallet was produced like Example 1 except having used the graphite whose mean particle diameter is 15 micrometers as a conducting agent of No.3 positive electrode mixture.

[0060]the compounding ratio of No.4 positive electrode mixture -- beta-MnO_2:graphite: -- carbon black: -- the positive pole pallet was produced like Example 1 except being FEP=96:1.5:1:1.5.

[0061]the compounding ratio of No.5 positive electrode mixture -- beta-MnO_2:graphite: -- carbon black: -- the positive pole pallet was produced like Example 1 except being FEP=90.5:7:1:1.5.

[0062]

[Table 2]

Example 4 (No.) No.1 No.2.No.3 No.4 No.5 [positive pole pallet material wt%]. [Mean particle diameter] (6 micrometers) (15 micrometers) (6 micrometers) Active material (beta-MnO_2) (6 micrometers) : 93.5 91.5 93.5 96 90.5 conducting agents (graphite) : 4 4 4 1.5 7 (6 micrometers) (Carbon black) : 1 (0.1 (0.1 (0.1 micrometer) micrometer) micrometer) 1 1 1 1 (0.1 micrometer) (0.1 micrometer) Binder (FEP) : 1.5 3.5 1.5. 1.5 1.5 (1 micrometer) (0.2 micrometer). (0.2 micrometer) [(0.2 micrometer) positive pole pallet (a)] mass (0.2 micrometer) (g) 2.713 2.705 2.704 2.708 2.715 (b) cracks and KAKE incidence rate (%) 15 0 0 0 0 (c) liquid adsorption (mg).434 355 436 437 Poor 440 [manganese dioxide lithium cell] (d) **** (%) 0 0 0 0(e) liquid spill occurrences 0 0 0 0 (f) internal resistance (omega) 7.6 5.9 9.2 4.4 (g) service capacity (mAh).At the time of 1komega discharge 354 376 315 415 At the time of 6.8komega discharge 566 569 555 545

[0063]As compared with the above-mentioned Examples 1-3, although the internal resistance of the cell of

No.2 is high, since this cause has the high compounding ratio of a nonconducing binder, it is guessed at the result of Table 2.

[0064]Since the particle diameter of a conducting agent is large, when it is the same compounding ratio, a surface area ratio becomes small to a conducting agent with small particle diameter, and although the internal resistance of the cell of No.3 is also high as compared with Examples 1-3, since the efficiency as a conducting agent fell, this cause is guessed.

[0065]Although the internal resistance of the cell of No.4 is also high as compared with Examples 1-3, since conductivity required for a positive pole pallet since the compounding ratio in the positive electrode mixture of a conducting agent is as low as 2.5 % of the weight fell, a cause is guessed.

[0066]In the spark test of 1komega of the cell of No.2 - 4, it ****ed with the result of above-mentioned internal resistance, and the tendency for service capacity to be low was accepted to the cell of Examples 1-3.

[0067]In a 6.8-ohm spark test, although only the cell of No.5 has low service capacity to other cells, this cause is considered because the amount of inputs of manganese dioxide which is positive active material became less by having made high the compounding ratio of the conducting agent in positive electrode mixture.

[0068]

[Effect of the Invention]The positive electrode mixture of this invention gives the conductivity and electrolysis solution absorbency which were excellent in homogeneity, weighing nature, and a moldability, and were excellent in the positive pole pallet. Therefore, it becomes possible to enable manufacture of the organic electrolysis liquid cell excellent in leakage resistance, a discharge characteristic, and productivity by using the positive pole pallet which consists of positive electrode mixture of this invention.

[Translation done.]